Integration Technical Note

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MITEL SX-2000 E1 DPNSS

Edition Note

This is the first edition of the *MITEL SX-2000 E1 DPNSS* Integration Technical Note. Information in this document applies to OneBox UM systems with Version 3.0 and later.

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MITEL SX-2000 E1 DPNSS EN/LZT 108 6654 R1A

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Overview

This Integration Technical Note (ITN) is written for dealers who are experienced with OneBox UM® and are familiar with its procedures and terminology. It also assumes that you are familiar with the features and programming of the MITEL SX-2000 telephone system.

This document describes how to integrate OneBox UM with a MITEL SX-2000 telephone system using the E1 DPNSS interface. Critical application considerations are documented, as well as installation and programming procedures necessary to integrate OneBox with the MITEL telephone system (referred to throughout this document as MITEL). The E1 DPNSS integration is an outband digital integration. The E1/PRI (ISDN) physical interface is a single 2.048-MB 32-channel interface that provides up to 30 digital trunks or voice channels per interface. Digital Private Network Signaling System (DPNSS) is a signaling protocol that enables the interconnection of PBXs and other equipment that supports the DPNSS protocol. E1 DPNSS can provide seamless, transparent interconnection of PBXs and PBX supplementary services over a public or private network. In this integration, OneBox is recognized by the MITEL as another PBX that is connected over a private network.

The MITEL E1 DPNSS connection is established at OneBox with the use of an Aculab™ High Capacity Digital Access card. The Aculab card interfaces with the E1 link to the MITEL and to the Dialogic card(s) in OneBox. Calls are sent to OneBox over the E1 DPNSS link, calling- and called-party information is parsed, and OneBox answers with the appropriate dialog. End-to-end DTMF, message-waiting indicator (MWI) operation, and callouts are supported features of DPNSS.

Use this document in conjunction with the *Installing OneBox* and *Administering OneBox* guides and with the OneBox online help system.

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References

More current information may be available from the following documents:

- *Installing OneBox*
- *Administering OneBox*
- *Aculab E1 PCI Installation and Replacement* spare parts document

Features Supported by this Integration

Tables 1 and 2 list the features supported using the MITEL SX-2000 integration.

Table 1. Call forward to personal greeting for these call types

Divert to OneBox...	Supported
No Answer	Yes
Busy	Yes
Forward All	Yes
Do Not Disturb	No

Table 2. MITEL SX-2000 E1 DPNSS Integration features supported

Feature	Supported	Notes
Automatic subscriber logon	Yes	
ANI/CLI	Yes	
“Announce Busy” greeting on forwarded calls	Yes	
Call screening	Yes	
Caller queuing	Yes	
DNIS	Yes	
End-to-end DTMF, attendant console	Yes	
End-to-end DTMF, proprietary telephones	Yes	
Fax Ports	Yes	See Note 1
Internal calling party ID for reply	Yes	
Live record, integrated	No	
Live reply to sender	Yes	
Message notification callouts	Yes	
MWI, set/clear	Yes	
MWI, inband/outband	Outband	
Networking, analog	Yes	
Overflow from OneBox to attendant	Yes	
Overflow to OneBox from attendant	Yes	
PBX-provided disconnect signaling	Yes	
Revert to operator from personal greeting	Yes	
Transfers, blind	Yes	
Transfers, confirmed	Yes	
Transfers, fully supervised	Yes	
Transfers, monitored	Yes	
Trunk ID for call routing	No	

Notes:
1. Requires separate analog fax cards.

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Critical Application Considerations

Known limitations or conditions within the telephone system and OneBox that affect the integration performance are listed here. General recommendations are provided when ways to avoid these limitations exist.

- The OneBox Lines tab parameter **Busy telephone line when closed** is not applicable to this integration.
- There is a maximum "rings to wait" value of four rings on a supervised transfer. OneBox is unable to monitor call progress during a transfer because the digital DPNSS trunk does not provide an audio path until a connection is made to the called party. OneBox assumes a six second ring cycle during transfer.
- OneBox does not display the line status of calls using route optimization channels for transfer purposes. Verify from the PBX that all E1 channels are idle before shutting down OneBox.
- Route optimization is recommended when integrating OneBox with an E1 DPNSS interface. Because the DPNSS interface is an external trunk route, all transfer actions require an additional DPNSS channel to initiate and complete the call. When route optimization is enabled in the PBX, the additional channel will release after the transfer is completed or after a period of time set within the PBX. When route optimization is not used, this second channel is remains in use for the duration of the transferred call.

  Any channel of the DPNSS circuit terminated on OneBox may be used to perform a transfer whether assigned as a OneBox port or not. For example, a 15-port OneBox system with a single 30-channel E1 interface would have an additional 15 non-OneBox channels to use for transfers, whereas a 30-port OneBox system with the same single E1 interface would have to use a second OneBox port to perform a transfer.
- Separate routes should be used for OneBox ports and virtual transfer lines. For instance, if OneBox will only use 15 ports of a 30-port E1 card, an external route of 15 lines should be created for the OneBox ports and the remaining ports configured into a separate route with the same characteristics. This will prevents ring-no-answer (RNA) conditions when callers are routed to ports not connected to OneBox.
- The Aculab card can only be restarted by restarting the telephony server. This may be required following a loss of synchronization or clock with the PBX over the E1 interface. Alternatively, synchronization problems with the DPNSS interface can be corrected at the PBX by blocking traffic to the E1 board, restarting the board, and then unblocking traffic.

- The first Aculab card is the master clock on the SCbus; it must be set as the Resolved Primary Master FRU of the Dialogic TDM bus in Dialogic Configuration Manager. The first Aculab card is the master clock on the SCbus; it must be set as the Resolved Primary Master FRU of the Dialogic TDM bus in Dialogic Configuration Manager. Please consult the *Aculab E1 PCI Installation and Replacement* spare parts document listed in the "References" section of this document for instructions on installing Java Runtime Environment software, installing Dialogic Third Party software, and configuring Dialogic Configuration Manager.
- Aculab does not provide BNC connectors on their PCI type boards. These boards are supplied with RJ45 connectors only. An Aculab RJ45 to BNC converter may be used to convert the connection to BNC.
- PCI boards have CTbus connectors and use CTbus or H.100 bus ribbon cables for connection. SCbus signaling is done over the H.100/CTbus interface.

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Installation Requirements

Review the following information before performing any of the procedures in this document. To install this integration successfully, you must meet the installation requirements for both the telephone system and for OneBox.

Telephone System Requirements

- MITEL SX-2000 PBX with system software version P or later
- One MC264 BA E1 DPNSS board provides 30 E1 channels
- 75-Ohm cable with BNC connectors for the low-impedance connection to the Aculab card, or 120-Ohm cable with RJ45 connector for the high-impedance connection to the Aculab card

OneBox Requirements

- Properly configured telephony server platform running Microsoft Windows 2000 Server with Service Pack 3
- OneBox UM version 3.0 or later
- Ericsson software key diskette with the MITEL SX-2000 DPNSS integration enabled
- Dialogic software version SR5.1.1 or later
- Aculab Configuration Tool software version 5.9.1a or later
- One or more of the following linecards:
  - → Aculab Rev.5 PCI single-port card, which supports 30 OneBox ports
  - → Aculab Rev.5 PCI dual-port card, which supports 60 OneBox ports
  - → Aculab Rev.5 PCI quad-port card, which supports 120 OneBox ports
- One digital Dialogic port for each OneBox voice port to be integrated. r Dialogic D/320 SCbus cards.
- Uninterruptible power supply and surge protection device (recommended)

Programming the Telephone System

Follow the recommendations and programming examples in this section to program the MITEL for integration with OneBox. Programming examples show commands and parameters that are necessary for integration. They do not represent PBX programming in its entirety.

The installing technician should be familiar with programming the telephone system. For detailed programming information on this software version or other software versions of the MITEL, refer to the appropriate MITEL SX-2000 documentation.

Programming the Link Descriptor Assignment

Program the Link Descriptor Assignment as shown in Table 3. The parameters in bold are the parameters required for the DPNSS link to OneBox.

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Table 3. MITEL Link Descriptor Assignment

LINK DESCRIPTOR ASSIGNMENT	
Digital Link Descriptor Number: 3	
Description	Value
Address for Message Control (A/B)	**A**
BER - Maintenance Limit, 10**-n, n=(3,4,5,6)	4
BER - Service Limit, 10**-n, n=(3,4,5,6)	3
Data Call Alternate Digit Inversion (Yes/No)	No
Framing Losses in 24 hrs - Maintenance Limit (0-9000)	255
Framing Losses in 24 hrs - Service Limit (0-9000	9000
Integrated Digital Access	**DPNSS**
Satellite Link Delay (Yes/No)	No
Slip Rate - Maintenance Limit (0-9000)	255
Slip Rate - Service Limit (0-9000)	7000
DS1 Parameters:	
Alarm Debounce Timer - Service Limit (300-3200)	500
B8ZS Zero Code Suppression - (Yes/No)	Yes
Enhanced Dual T1 Card only:	
Operation Mode (CSU/DSX-1)	DSX-1
CSU Tx Line Build-Out (0,7.5,15,22.5 db)	
DSX-1 line Length (0-133,134-266,267-399,400-533,534-655 ft)	0-133
Inverted D channel (DPNSS only) (Yes/No)	No
E1 Parameters (Enhanced Dual E1 Card only):	
CRC-4 enabled (Yes/No)	No
E1 line Length (0-133,134-266,267-399,400-533,534-655 ft)	0-133
Italian Parameters:	
Digital Link Fault Delay Timer (0-360 sec)	240

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Programming the Digital Link Assignment

Program the Digital Link Assignment as shown in Table 4. This table assigns the digital link to the physical card location in the PBX.

Table 4. MITEL Digital Link Assignment

DIGITAL LINK ASSIGNMENT						
Digital Link						
	Descriptor					
Cab	Shlf	Slot	Link	Card Type	Number	Text
3	**1**	**4**	**2**	**CEPT Formatter**	**3**	**ONEBOX**
8	1	2	1	CEPT Formatter	2	DPNSS TO LONDON
8	1	3	2	CEPT Formatter	2	DPNSS TO COVENTRY

Programming the Trunk Service Assignment

Program the Trunk Service Assignment as shown in Table 5. Program a separate class of service for the OneBox trunks. Set the baud rate to 9600.

Table 5. MITEL Trunk Service Assignment

TRUNK SERVICE ASSIGNMENT											
Trunk						Dial In Trunks					
ServiceNo.	RLT	COS	COR	Baud Rate	Intercept No.	Non-dial In Trunks Answer Points			Incoming Digit Trunk Modification		Label
						Day	Night 1	Night 2	Absorb	Insert	
1	No	64	64	9600	1				0	0	LINK TO 5
2	No	64	64	9600	1				0	0	BT ISDN 1
3	No	64	64	9600	1				0	0	BT ISDN 2
4	No	64	64	9600	1				0	0	BT ISDN 3
5	**No**	**54**	**64**	**9600**	**1**				**0**	0	**ONEBOX**
6	No	1	1	300	1				0	0	COVENTRY

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Programming the Trunk Circuit Descriptor

Program the Trunk Circuit Descriptor as shown in Table 6. The table shows default values except for the changes in bold.

Table 6. MITEL Trunk Descriptor Assignment

MSDN-DPNSS-DASSII TRUNK CIRCUIT DESCRIPTOR ASSIGNMENT	
Trunk Circuit Descriptor Number: 5	
Descriptor	Value
Signaling Protocol (MSDN-DPNSS/DASS II)	**MSDN-DPNSS**
Card Type (Cept/DS1)	CEPT
Dual Seizure Priority (Incoming/Outgoing)	Incoming
ISDN BRI Mode (blank/NT/LT)	
Transmission Parameters:	
Far End Connection (Main PBX/Satellite PBX/Toll/Local)	**Satellite PBX**

Programming the Trunk Assignment

Program the Trunk Assignment as shown in Table 7. Use only vacant interconnect numbers and trunk numbers.

Table 7. MITEL Trunk Assignment

TRUNK ASSIGNMENT									
Cab	Shlf	Slot	Circ	Card Type	Trunk Number	Trunk Service Number	DTS Service Number	Circuit Desc. Number	Inter-connect Number
3	1	4	31	CEPT Formatter	801	21		5	63
3	1	4	32	CEPT Formatter	802	21		5	63
3	1	4	33	CEPT Formatter	803	21		5	63
3	1	4	34	CEPT Formatter	804	21		5	63
3	1	4	35	CEPT Formatter	805	21		5	63
3	1	4	36	CEPT Formatter	806	21		5	63
3	1	4	37	CEPT Formatter	807	21		5	63
3	1	4	38	CEPT Formatter	808	21		5	63
3	1	4	39	CEPT Formatter	809	21		5	63
3	1	4	40	CEPT Formatter	810	21		5	63
3	1	4	41	CEPT Formatter	811	21		5	63
3	1	4	42	CEPT Formatter	812	21		5	63
3	1	4	43	CEPT Formatter	813	21		5	63
3	1	4	44	CEPT Formatter	814	21		5	63
3	1	4	45	CEPT Formatter	815	21		5	63
3	1	4	46	CEPT Formatter	816	21		5	63
3	1	4	47	CEPT Formatter	817	21		5	63
3	1	4	48	CEPT Formatter	818	21		5	63
3	1	4	49	CEPT Formatter	819	21		5	63
3	1	4	50	CEPT Formatter	820	21		5	63
3	1	4	51	CEPT Formatter	821	21		5	63
3	1	4	52	CEPT Formatter	822	21		5	63
3	1	4	53	CEPT Formatter	823	21		5	63
3	1	4	54	CEPT Formatter	824	21		5	63
3	1	4	55	CEPT Formatter	825	21		5	63
3	1	4	56	CEPT Formatter	826	21		5	63
3	1	4	57	CEPT Formatter	827	21		5	63
3	1	4	58	CEPT Formatter	828	21		5	63
3	1	4	59	CEPT Formatter	829	21		5	63
3	1	4	60	CEPT Formatter	830	21		5	63

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Programming the Trunk Group Assignment

Program the Trunk Group Assignment as shown in Table 8. Add the configured trunk numbers into a new trunk group.

Table 8. MITEL Trunk Group Assignment

TRUNK GROUP ASSIGNMENT	
Trunk Group Number: 7	
Hunt Mode (Circular or Terminal): Terminal	
Trunk Group Busy RAD:	
Maximum Network Hops:	
Member	Trunk Number
1	801
2	802
3	803
4	804
5	805
6	806
7	807
8	808
9	809
10	810
11	811
12	812
13	813
14	814
15	815
16	816
17	817
18	818
19	819
20	820
21	821
22	822
23	823
24	824
25	825
26	826
27	827
28	828
29	829
30	830

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Programming the Digit Modification Assignment

Program the Digit Modification table as shown in Table 9. Verify that there is a digit modification available that doesn't absorb any digits.

Table 9. MITEL Digit Modification table

Digit Modification Assignment			
Digit Modification Number	Number of Digits to Absorb	Digits to be Inserted	Final Tone Plan Information Marker
1	1		
2	**0**		
3	1		

Programming the Route Assignment

Program the Route Assignment as shown in Table 10. Use the previously configured information to setup the route.

Table 10. MITEL Route Assignment

Route Assignment				
Route Number	Trunk Group Number	COR Group Number	Digit Modification Number	Digits Before Outpulsing
60			1	1
61	**7**	**64**	**2**	**2**
62		1	1	
63		1	1	
64		1	1	
65		1	1	

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Programming the OneBox Pilot Number

Program the OneBox Pilot Number as shown in Table 11. Use the Automatic Route Selection Assignment forms to configure the voice mail pilot number.

Table 11. MITEL Automatic Route Selection Assignment

Automatic Route Selection Assignment			
Leading Digits: 89			
Second Dial Tone Yes/No/Alternate:		COR Group Number:	
Digits Dialed	Number of Digits to Follow	Termination Type Number	
00	**0**	**Route**	**61**
65	0	Route	29
66	0	List	12

Verifying the Link Status

Once you have completed the PBX programming, the OneBox installation, and the E1 connections are established you can use the following commands to check the status of the link:

```
DTSTAT READ <PLID>
```

The DTSTAT READ command should indicate the Link is available.

```
STAT <PLID>
```

The STAT should indicate that all the channels are idle.

Programming the Subscriber Telephones

Subscriber telephones can be programmed to forward as follows.

- If using monitored transfers on OneBox, program **FORWARD-NO ANSWER** on subscriber telephones.
- If using blind transfers on OneBox, program **FORWARD-BUSY/RNA** on subscriber telephones.

As an alternate method of programming for subscriber stations, build a call re-routing table. This method allows subscribers to change forwarding to a different target. Also, the programming will not be lost in the event of a power failure.

- In the Call Rerouting First Alternative Assignment form (CAL R F), assign the OneBox hunt group pilot as the first alternative. Specify Busy, DND, and RNA if you will be using blind transfers. Assign them to reroute on CO lines, internal, and TIE lines if applicable.
- In the Call Rerouting Assignment form (CAL R AS), assign subscriber stations to the First Alternative.

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Configuring OneBox

Once the telephone system is programmed, you must configure OneBox for the integration. During setup, you'll need the following information, specific to this integration, to configure OneBox.

1. In the Installation Configuration dialog box, enter the name of the site in the Site Name box, the mailbox length in digits in the Mailbox Length box, and the first extension number for the first line in the First Extension box. Select **MITEL** as the manufacturer, **SX-2000** as the model, and **DPNSS** as the integration type.
2. In the Switch Section Options dialog box, enter the hunt group access code you configured previously in the section, *Programming the Telephone System*. This is the pilot number that users dial to reach OneBox.
3. Once setup is complete, go to the Lines tab in the Configuration utility to verify that the extension numbers are assigned to the correct lines, and enable callouts to suit your application. For information on configuring callout settings, see the topic "Configure callout settings," in the online help system.

The settings related to the telephone system in the Switch Options dialog box are filled in correctly when you select the correct telephone system during setup. You may need to customize other settings in the Switch Sections and Integrations Options dialog boxes to suit the requirements of each application. Refer to *Installing OneBox* or the online help for more details about setting these parameters. Or, to display a tooltip that briefly describes a setting, pause the mouse over the setting for which you want more information.

Installing the Aculab Card

This section describes the Aculab High Capacity Digital Access card. The Aculab card provides the network interface between the PBX E1 network card and OneBox. The Aculab card is interfaced to OneBox through one or more Dialogic cards that supply the telephony component of each OneBox line. A single-port E1 Aculab card supports 30 voice channels, a dual-port E1 Aculab card supports 60 voice channels, and a quad-port E1 Aculab card supports 120 voice channels.

Aculab markets supports the PCI-type E1 cards. Aculab cards of either bus type require at least one separate interrupt and memory address on the telephony server platform. Multiple Aculab cards can share the same IRQ, but require unique memory addresses. The Aculab card interfaces with the Dialogic card(s) in the telephony server via an SCbus connection. The Aculab PCI card has an H.100 connector that is cabled to the H.100 connectors of the Dialogic PCI cards with an H.100 or CTbus ribbon cable. SCbus signaling is used over the H.100 bus. When mixing cards of H.100 and SCbus bus types in the system, H.100/SCbus adapters are required to satisfy the physical connection requirements of these ribbon cables.

For detailed instructions on the installation of the Aculab card, refer to the *Aculab E1 PCI Installation and Replacement* spare parts document.

Adding the Aculab Card to OneBox

The Aculab card is the clock source for all Dialogic cards installed in the Telephony Server, therefore all Dialogic cards installed in the system must be connected to the same SCbus. Before the Dialogic service can be started, the Aculab card must be installed, configured, and running in the system. Add the Aculab board to OneBox after the Aculab and Dialogic software packages are both installed and their configuration is complete. OneBox does not auto detect the Aculab card; you must install it manually from the Boards tab. Once you have configured OneBox for your particular integration, you must add the Aculab board and configure it for the signaling type you will be using. Follow these steps to install the card.

1. Click **Start**, point to **Settings**, then to **Control Panel**, and then select **OneBox Configuration**.
2. Click the **Boards** tab, and then click the **Add** button. The **Board Options** dialog box appears.
3. Choose Aculab from the **Manufacturer** list.
4. Select the type of Aculab card you are installing from the **Model** list.

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5. Select the type of signaling from the **Protocol** list.
6. Under **Sub-Board Settings**, from the **Value** list for **Sub-Board Type**, select the PBX type that will be supported with this card.
7. Click **OK** when you are finished.

The first Aculab card is the master clock on the SCbus; it must be set as the Resolved Primary Master FRU of the Dialogic TDM bus in Dialogic Configuration Manager. Prior to starting OneBox, make sure the Java Runtime Environment software is installed, the Dialogic Third Party Software utility is properly configured for Aculab, the Dialogic Configuration Manager is properly configured for Aculab, and the Dialogic service is running and has been set to automatic.

Completing the Integration

Now you are ready to finish installing OneBox UM. See the guides *Installing OneBox* and *Administering OneBox,* or refer to the OneBox online help system, for instructions. For general information on integrations, you may also wish to consult "Integrating OneBox with the Telephone System," in the guide *Installing OneBox*, and the topic "Integrate the Telephony Server with the telephone system," in the online help system.

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